REMARKS

Claims 1-7 have been rejected under 35 U.S.C.§102(b) as being anticipated by the Applicants' submitted prior art (AAPA) Figure 2. Claims 8-10 have been rejected under 35 U.S.C.§ 103(a) as being unpatentable over AAPA (Fig. 2) in view of Elliot, U.S. Patent No. 4,414,491.

The claims have been amended to obviate the Examiner's rejection.

The claims as now amended are directed to a device for switching on and powering discharge lamps comprising at least a current limiting device, a square wave generator, an igniter, two high tension connection cables, and a lamp holder with a discharge lamp coupled. The device has at least one igniter comprising at least a high tension transformer and an overlapping transformer. The igniter is divided into a first stage of the igniter, or pulse generator transformer, and the high tension transformer. The first igniter stage, or pulse generator transformer, and the high tension transformer are assembled along with the above mentioned components. The device includes a lamp bottom housing such that the first igniter stage is fixed on the bottom housing and the current limiting device module is connected by two reduced section cables to the first stage of the igniter, or pulse generator transformer and further wherein the current limiting device module and the first stage of the igniter, or pulse generator transformer, are subjected to movement and/or traction.

The Applicants' invention is directed to discharge lamps of high quality chromatic performance. The lamps are targeted to be utilized by the professional lighting market where color rendering and beauty of the light projected pattern are at a premium and where reliability, long life of products and ease of use are basically mandatory parameters. The lamps

can have a power from 125W up to 18,000 W and their ignition voltage threshold can be up to 70,000V.

Prior art light fixtures or luminaires include electronic balasts and an extension cable connecting the luminaire to the ballast, as shown in Figures 1 and 2 of the application. The Applicants' claims are directed to the ignition system of the lighting fixture. Luminaires are normally equipped with an optical system, therefore the lamp is traveling within the luminaire enclosure for a certain distance contained with in the focusing range, which is determined by the optical system itself. Thus, this should exclude the comparison of this type of light devicewith any systems where the lamp is not moving.

Typical systems available within the industry feature a self-contained igniter normally located in a fixed part of the luminaire's housing. The most common limitations of the standard approach of one box igniter systems, is that they have experienced problems with the high voltage cable insulation. The hot re-ignition of the lamps requires a very high voltage. In this condition the mobile cables connecting the igniter to the lamp holder need to have a perfect insulating status. In industry use, these cables are aging very quickly and after a relatively short time, approximately one year of use, they lose their mechanical flexibility. Thus the insulating sleeve or jacket becomes more brittle and some miniature cracks develop. The result is that during hot re-ignition of the lamp, when the maximum ignition voltage is required, sparks may occur between the high voltage cables and the metallic housing of the luminaire. Not only is the lamp not restarted but there is some leakage to ground and most commonly there are severe electrical problems. Thus, it is obvious that due to the focusing requirement of the luminaire, the internal cables connecting the igniter (fixed part) to the lamp holder (mobile

part) must be: highly insulated because of the high voltage they carry during ignition, highly flexible because of the compact space in which they must move due to the focusing action, i.e. movement of the lamp holder along the optical axes during focusing. They must also be highly resistant to temperature, due to the high heat developed within the luminaire housing while the lamp is functioning, rated for high currents as the current feeding the lamp is passing on these cables and, depending on the lamp Wattage, which may be a high value, and finally they must be long life, which means maintaining the initial characteristics for more than 5,000 hours operation. All of these requirements are difficult to satisfy with the available components in the industry today. Some technologies and materials may solve part of the problems, but not all of the problems. In the industry today, the internal cables are frequently replaced, after an average life of operation of only 1,500 hours which corresponds to 1.5 years. This is not acceptable.

During ignition, the igniter circuitry develops high frequency pulses of several kilo Hertz with a high voltage such as 70,000 Volts for an 18 kW lamp. Because the igniter is located inthe fixed part of the luminaire, the high voltage cables have to be of a certain length. This length introduces significant capacitance losses during the high frequency ignition pulses generation. To compensate for these loses and ensure the proper value of signal to the lamp, the igniter has to be overdimensioned and this results normally in weight, cost and noise problems. This is not noise during ignition but during the normal operation of the lamp. In conventional systems this noise is generated by the output stage of the overlapping transformer as these remain connected to the same circuit of the lamp current that is the square wave. This

is especially apparent when used on video or in film production environments, while the audio recording is on.

The Applicants' invention is directed to dividing the igniter into two stages. The novel concept includes the idea of mounting the first igniter stage on the fixed part of the luminaire bottom housing. The output of this stage generates only 6kV with a very low current of a few milliamps and only works during the duration of the lamp ignition, on average about 1 second. The second stage of the igniter including the overlapping of the transformer, on the moveable carriage, together with the lamp holder and the reflector system are mounted to the second stage. In such a way, the high voltage cables going from above the stage to the lamp are very short and fixed. Therefore they are no longer subject to wear and no longer represent an electrical load, i.e. capacitance losses, for the whole system. Having the high voltage stage of the igniter assembled on the mobile carriage, under the lamp holder, permits one to have a very short high voltage cable which is fixed so that they do not represent capacitance loss during the ignition and therefore the size of the igniter can be optimized. Additionally they will not touch any moving part and will not be subject to any movement. With these conditions they have a much longer lifetime and will not develop the known problem of the conventional system, where very often the rapid wearing of the high voltage cables causes the lighting fixture to not start and not function.

Additionally, independent of the fixed portions of the invention, the two systems function in a different manner.

In the Applicants' invention, the toroidal cores for the high voltage stage in order to eliminate the noise, is different than in a conventional system whereby the secondary stage of

the overlapping transformer that is passed by a square wave current. The Applicants' are not inventing the known effect of the toroidal cores, however they refer to a specific configuration and describe the geometry of the whole system. If one had to use toroidal cores in a standard igniter, the box would become so large for a specific given power that they would not be utilized in the industry. With the new igniter it is possible to utilize the toroidal cores with benefits that include optimized performance. These benefits include optimized dimensioning given that they are assembled very close to the lamp, therefore the cable lengths can be very small and capacitance losses are practically negligible.

The Applicants' system should not be compared to small power cold restrike discharge lamps as the parameters and values are very different. The Applicants' invention can be implemented in hot restrike discharge systems such that they can be utilized in large power systems of up to 18 kW. The hot re-ignition voltages are in a range of 70kV. This invention has made it so that proper insulation can be included with the high voltage portions of the invention which is a real plus to the safety of the system. There has also been a significant reduction in the weight, size and cost of the entire system.

In view of the foregoing, it is believed that the amended claims and the claims dependent therefrom are in proper form. In view of the foregoing, the Applicants respectfully contend that the teachings of admitted prior art AAPA Fig. 2 does not anticipate the Applicants' invention. Additionally, the admitted prior art in view of Elliott'491 does not render the Applicants' invention as obvious. Thus, claims 1-3, 6-10 and 12-15 are considered to be patentably distinguishable over the prior art of record.

The application is now considered to be in condition for allowance, and an early indication of same is earnestly solicited.

Respectfully submitted,

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